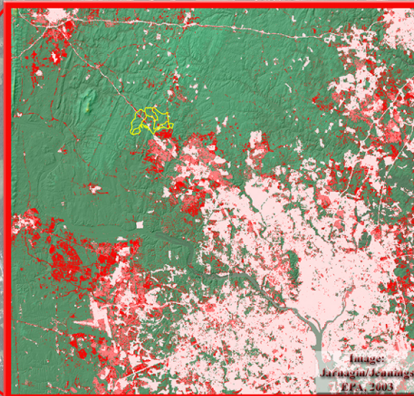


**USEPA - USGS - Montgomery County DEP
- UMBC - University of Maryland College Park
Collaborative Hydrological Research in the
Clarksburg Maryland Special Protection Area**

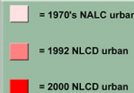
Research Collaborators:

**USEPA Landscape Ecology Branch, Reston, Virginia; USGS Water Resources Division, Baltimore, Maryland;
Montgomery County Department of Environmental Protection (DEP), Rockville, Maryland;
University of Maryland, Baltimore County Maryland, Department of Geography and Environmental Systems
and The Center for Urban Environmental Research and Education (CUERE);
University of Maryland, College Park Maryland;
Environmental Systems Analysis, Inc., Annapolis Maryland
and The Maryland-National Capital Park and Planning Commission (M-NCPPC), Silver Spring Maryland**

**Our Study Area is the
Clarksburg Special
Protection Area (CSPA)**



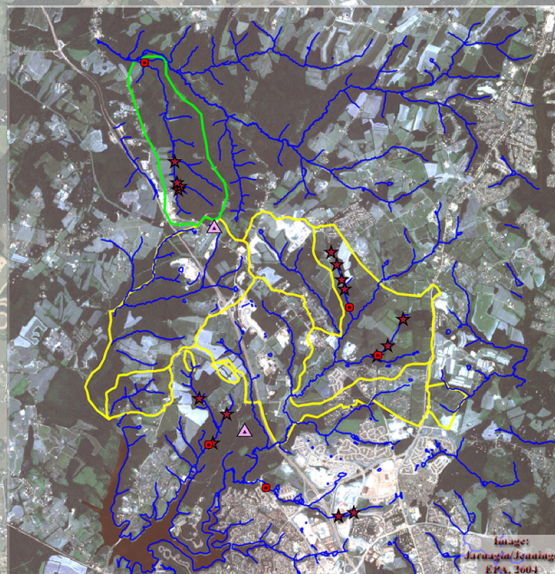
Satellite classification of urban land cover 1970s - 2000. The CSPA (yellow outline above) is at the outer edge of the current development extent of the core Washington DC metropolitan area. Image from EPA Science Forum 2003 poster: "Use of LIDAR to Monitor Stream Morphology Changes Due to Urbanization of a Suburban Watershed". S. Taylor Jarnagin and David B. Jennings, USEPA Landscape Ecology Branch, Reston VA 20192-0002.



**Montgomery County DEP and Department of Permitting Services
are mapping development and placement of Best Management
Practice (BMP) stormwater control structures designed to
mitigate the effects of urbanization within the CSPA**



**National Elevation Data (NED), 30-meter pixel spatial resolution, compared with
sub-meter DEM derived from a Light Detection And Ranging (LIDAR) overflight
of the CSPA in December 2002. Both images have been processed to the same
color elevation scale to graphically illustrate how much more topographical detail
is available from the LIDAR imagery and how the mapping of anthropogenic
development structures can be assisted with LIDAR. USEPAQ and UMBC are
collaborating on the analysis of changes in topography and impervious surfaces
associated with the CSPA development. Image from EPA Science Forum 2003
poster: "Use of LIDAR to Monitor Stream Morphology Changes Due to
Urbanization of a Suburban Watershed". S. Taylor Jarnagin and David B.
Jennings, USEPA Landscape Ecology Branch, Reston VA 20192-0002.**



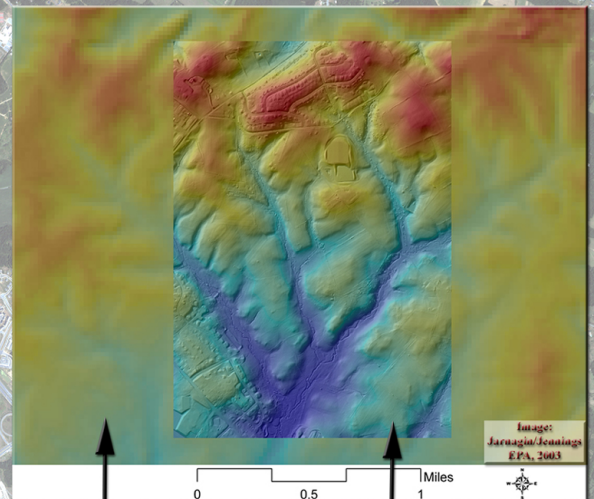
Legend

- Clarksburg Stream Gages
- ★ Stream Monitoring Sample Sites
- △ Rain Gages
- CSPA Hydrology
- Soper Branch Control Area
- CSPA Boundary

1 0.5 0 1 2 Miles



CSPA Streamflow and precipitation gages and monitoring locations. USGS WRD, University of Maryland College Park, Environmental Systems Analysis, M-NCPPC and Montgomery County DEP are collaborating on the collection of these data. The base map is an IKONOS 4-meter satellite image obtained in June 2002.



Shaded Relief from
National Elevation Data
(NED, 30 m DEM)

Shaded Relief from
LIDAR (0.5 m DEM)